

being between and on the plates in small numbers, but no accessory plates exist on it ; beneath, the disk is covered with skin. Spinules are found on the upper part of the arm, and the first and second upper arm-plates are spined. The spines of the side arm-plates project, and there are hooks ; there is one tentacle-scale. These characters distinguish the form, and necessitate its entry into a new genus, *Polypholis*. The species is *Polypholis echinata*.

## DESCRIPTION OF PLATE III.

- Fig. 1. The disk and part of the arms from above, magnified.  
 2. The disk from below, magnified.  
 3. The spinules from the disk, magnified.  
 4. The arm spines and hooks, magnified.  
 5, a, b, c. The tentacle-scale, magnified.  
 6. Diagram of the mouth-shield, side mouth-shield, and angle of jaw.  
 7. *Polypholis echinata*, nat. size.

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On the Hebridal Argentine. By FRANCIS DAY, F.L.S.

[Read March 4, 1880.]

(PLATE IV.)

## ARGENTINA SPHYRÆNA.

*Sphyræna parva*, Rondel. i. p. 227, c. fig. ; Gesner, pp. 883, 1061.  
*Argentina*, Willughby, p. 229 ; Ray, p. 108 ; Artedi, Synon. p. 17, and Genera, p. 8.

*Argentina sphyræna*, Linn. Syst. Nat. i. p. 518 ; Gmel. Linn. p. 1394 ; Risso, Ichth. Nice, p. 336, and Europ. Mérid. iii. p. 462 ; Cuv. Mém. Mus. i. p. 228, pl. xi. ; Nilsson, Skand. Fauna, Fisk. p. 476 ; Günther, Catal. vi. p. 203 ; Collett, Norges Fiske, p. 171.

*Argentina silus*, jun., Nilss. Obs. Ichth. 1835, pp. 3-7.

*Osmerus hebridicus*, Yarrell, Supp. Brit. Fishes, and ed. 2, ii. p. 133 ; Rudd, Zoologist, 1852, p. 3504 ; White, Catal. Brit. Fish. p. 79.

*Argentina Cuvieri* and *Yarrelli*, Cuv. & Val. xxi. pp. 413, 418.

*Argentina hebridica*, Nilss. Skand. Faun., Fisk. p. 474 ; Yarrell, Brit. Fishes (ed. 3), i. p. 300 ; Günther, Catal. vi. p. 203.

*Hebridal Smelt*, Couch, Fishes of the British Isles, iv. p. 297.

*Argentina decagon*, Clarke, Trans. & Proc. New Zealand Institute, 1878, xi. p. 296, pl. xiv. f. 2.

*Stromsild*, Christiania.

B. vi. D. 10 ( $\frac{2}{5}$ ). P. 14. V. 11. A. 12 ( $\frac{3}{9}$ ). C. 19. L. 1. 52.  
 L. tr.  $\frac{3}{4}$ . Cæc. pylor. 5.

Length of head  $4\frac{2}{3}$ , of caudal fin  $7\frac{1}{2}$ , height of body  $6\frac{1}{2}$  in the total length. *Eyes* with moderately wide adipose lids, the anterior of which rather overlaps the posterior above the centre of the upper edge of the orbit; diameter of eye  $3\frac{1}{2}$  in the length of the head, 1 diameter from the end of the snout and also apart. The shape of the fish is as follows:—The back, sides, and abdominal surfaces flattened, so as to give it a general tetragonal form, these various surfaces being divided one from the other by a well-developed ridge. These four flat surfaces are further subdivided by other parallel ridges, one of which is a short distance internal to the upper orbito-caudal ridge; a second a little above the pectoro-caudal ridge. In addition to these four secondary ridges, there exists another short one from the lower edge of the base of the pectoral fin to the ventral. Snout conical and somewhat depressed; upper surface of the head flat, its sides compressed. Upper jaw slightly longer than the lower; the maxilla scarcely reaches above two thirds of the distance to beneath the front edge of the eye. The suborbital ring of bones, the præopercle, opercle, and upper portion of the subopercle with a rather thick adipose covering. *Teeth*: none in the jaws; an arched row of small ones across the head of the vomer, and continued on to the anterior and contiguous portion of the palatines; a single row of eight large and somewhat recurved ones are placed on the upper surface of the front portion of the tongue. *Gill-rakers* rather widely separated, thick, and the longest about one fourth the diameter of the orbit in length. *Fins*—First dorsal as high anteriorly as the body beneath it, its posterior rays about two fifths the height of its front ones; adipose fin placed above the last anal rays; pectoral if turned forward reaches the middle of the eye; ventral inserted in the middle of the distance between the end of the snout and the base of the caudal fin, while it is beneath the last dorsal ray; anal highest anteriorly, where it equals the length of the base of the fin; caudal forked. *Scales* large, thin, higher than long; those along the back adherent, those on the sides more deciduous. Minute ossicles, having a stellate or spinate form, exist on the scales of the back, and also on some of those in the abdominal region. The row of scales immediately beneath that of the lateral line is the largest; most have somewhat crenulated edges. *Lateral line* on a row of smaller scales, well marked, and passing to the centre of the base of the caudal fin. *Cæcal appendages*—five long ones, loaded with fat. The example is a male, full of milt. *Colours*—of a light olive along the back, becoming silvery

white on the sides; a black spot at the upper edge of the orbit and a smaller one on the snout; a darkish longitudinal mark along either lobe of the caudal fin near its outer edge.

I now propose considering whether *Argentina sphyraena*, Linn., and *A. hebridica*, Yarrell, are or are not identical, and which Collett, as I believe, with good reason states they are. Valenciennes gives the formula thus:—

<i>Argentina sphyraena</i> .....	D. 10.	A. 12.	V. 10.	P. 12.
<i>A. hebridica</i> .....	D. 11.	A. 12.	V. 11.	P. 14.

But these numbers evidently are subject to great variation; and no undoubted criterion can be deduced from the number of fin-rays or scales. Nilsson found from 14 to 20 caecal appendages in *A. hebridica*, whereas *A. sphyraena* is said to have only 12. If so great a variation as 6 can occur in one undoubted species (especially as the present example had only 5 long ones), it would be hazardous to consider that these variations in number are sufficient to constitute distinct species.

The principal difference pointed out in the British-Museum catalogue is that in *Argentina sphyraena* the height of the body is 8 in the total length, while in *A. hebridica* it is  $5\frac{1}{2}$  (this should be  $5\frac{7}{9}$ ). The following are the proportions of some I have examined or obtained the accurate dimensions of, as Collett has stated that the proportionate length to height varies with age; fractions are omitted if very trivial:—

1 from Sicily .....	5 inches long,	height 1 in 8 of total length.	British Museum.
1 „ Norway ..	6 „	„ 1 „ 8 „	Collett.
1 „ Bute.....	6½ „	„ 1 „ 5⅔ „	Yarrell.
1 „ N. Zealand	6·9 „	„ 1 „ 7 „	Clarke.
1 „ ? .....	7 „	„ 1 „ 7½ „	British Museum.
1 „ Nice.....	7·3 „	„ 1 „ 6½ „	British Museum*.
1 „ Norway ...	8½ „	„ 1 „ 6 „	Collett.
1 „ Skye.....	9½ „	„ 1 „ 6½ „	Day.

There can be no doubt but that my Skye example agrees with Yarrell's, wherein he found the height as 1 in  $5\frac{7}{9}$ , but does not distinctly say whether his specimen was a skin or in spirit. Valenciennes states his examples of the same species were 1 in 8 of the total length, or similar to what he found existed in *A. sphyraena*. As we see in those examples which have been preserved in alcohol, some the height of whose body is 6, others  $6\frac{1}{2}$ , 7, or 8, in the total length, it is evident that this proportion varies, and

\* The length of the caudal fin is deduced from the average of other specimens, as this fin is often broken in museum examples.

cannot be taken as a means for the discrimination of the two so-called species, which must be considered as one.

There is one subject respecting the air-bladders of the fishes of this genus which is of great interest, belonging, as they do, to the family Salmonidæ, wherein this organ is of the Physostomous variety, but destitute of any chain of ossicles connecting it with the internal ear, as seen in the true freshwater Cyprinidæ, Characinidæ, and Siluridæ\*. Valenciennes mentions that the museum at Paris had received a very good example of *Argentina silus*, a little more than a foot in length, from the Bergen Museum. He supposed that it had been captured at a great depth, for its stomach was inverted. This inversion of the stomach is observed in fishes suddenly brought up from great depths; and is known to be caused by the pressure of the water being rapidly lessened or entirely removed, causing the gases in its interior to expand and either burst the air-bladder or force the stomach into the mouth. I do not think this phenomenon has been observed in Physostomous fishes, to which the Salmonidæ belong, as the pneumatic tube, which is pervious throughout life, acts as a safety-valve, and would permit this rapidly expanding gas to find an exit by the alimentary canal. This brings us to the question of whether the Argentines are or are not Physostomi, the same as the remainder of the Salmonidæ. Valenciennes states that they belong to the Physoclisti, as, so far as he could ascertain in three well-preserved examples, no pervious pneumatic tube could be detected.

If the Argentines undoubtedly belong to the class of fishes having closed air-bladders, it is an exceedingly interesting fact—one, however, I have as yet had no opportunity of investigating. The genus *Salmo* contains fish, some of which are anadromous, others freshwater; but their affinities are unmistakably marine. And here we observe another link in finding *Atherina*, one of the deep-sea Salmonidæ, possessing a closed air-bladder smaller than perceived in other genera of the same family, perhaps due to the depths at which it resides. For were it large and of the Physostomous type, probably it would be unable to keep it distended with gas, as such would be pressed out through its pneumatic tube, unless the same mechanism were adopted as we see in the

\* Physostomous fishes are mostly freshwater forms, having a chain of ossicles as described; or if marine, they are mostly surface-swimmers or littoral species, with a tubular prolongation of the air-bladder instead of a chain of ossicles. Physoclistous fishes appear to be, as a rule, marine or of marine origin.

ground-feeding Loaches and some of the Siluroids, where this organ is protected from pressure by being enclosed in bone by a development of the parapophyses of the anterior vertebræ.

We find a figure and description of this species in Rondelet's Marine Fishes, which was reproduced by Gesner. Willughby gives "*Pisciculus Romæ Argentina dictus. Sphyræna parva sive Sphyræna secunda species*, Rondeletio Gesner 1061,"—very clearly indicating that this author referred to the fish described by Rondelet and Gesner; while it was likewise his Roman deep-sea fish from whose air-bladder materials were obtained for the manufacture of artificial pearls. Ray copies almost verbatim from the authors I have quoted. Doubtless Artedi's species was identical with *Argentina sphyræna* of Linnæus, but not with Gronovius's fish. Risso, in his 'Ichthyology of Nice,' refers to the same fish, under Linnæus's name, as being captured throughout the year in the sea, as well as to its air-bladder being employed in artificial pearl-making. The synonyms I have given likewise show how it has been observed upon by Cuvier, Nilsson, Yarrell, Valenciennes, &c., the last-mentioned author, as is well known, having a partiality for changing specific names. Thus he gives *Argentina sphyræna* of Linnæus and Cuvier as *A. Cuvieri*, admitting the two to be identical: and he changes *Osmerus hebridicus*, Yarrell, into *Atherina Yarrelli*.

Up to the present time I have only been able to find three British examples of this fish recorded, and all mentioned by Yarrell. Two were from the S.W. coast of Scotland, where the fishermen reported it as well known, but rarely seen: one of these was  $8\frac{1}{2}$  inches long, taken in 1836, full of roe, in the bay of Rothesay, Isle of Bute; the second,  $6\frac{1}{2}$  inches in length, in November 1837 near the same spot, on a hand-line baited with a piece of mussel, and in 12 fathoms of water, about 200 yards from the shore. The third, of which I have been unable to obtain any description, came from the German Ocean off Redcar, in Yorkshire, where it was obtained by Mr. Rudd, who showed it to Mr. Yarrell.

Couch, when he published his work on the Fishes of the British Isles in 1862, did not appear to have met with the species, although he observes that it "is not rare in the sea near the islands to the north of Scotland," but omits giving his authority for the statement. He likewise remarks, "I am informed by Mr. John Iverach of Kirkwall, in Orkney, that it is not known to the fishermen of that island." Four years subsequently (1866) Dr.

Günther, in the 'Catalogue of the Fishes of the British Museum,' vi. p. 203, quotes "*The Argentine*, Low, Fauna Orcadensis, p. 225," as a synonym of *Argentina hebridica*, which reference, were it correct, would show that both Yarrell, Couch, and other antecedent authors had been in error in believing that this fish had not, previously to the capture of the Bute example in 1836, been recorded from the British seas. On referring, however, to Low, it will be seen that he terms his single example of an Orkney fish (which was not above an inch in length) "*the Argentine*," and refers to Pennant, who applied this name of *Argentine* to the *Maurolicus borealis*, pertaining to the family of Sternoptychidæ; and Low's references to Willughby, Ray, and Linnæus may have been copied from Pennant's 'British Zoology.' Irrespective of this, in vol. v. p. 389 of the British-Museum catalogue, Low's single specimen is also referred to *Maurolicus borealis*, while it is manifestly impossible that one fish can pertain to two distinct families.

The example I have to record is one of 9·5 inches in length, in a good state of preservation, having been placed in whiskey immediately after it had been captured. It was taken in October 1879, near Lochalsh, off the Skye shore, by a fisherman using a hand-line, the hook being baited with a piece of mussel; its captor considered it very rare, stating that he had only once previously taken an example. Not only is the specimen an interesting one, but likewise the locality from which it was received, the N.W. coast of Scotland, showing that it is by no means improbable that it may exist all round that country.

The Argentine is found extending from the shores of Norway to those of the west coast of Scotland and the German Ocean on the east coast of Yorkshire; thence through the Mediterranean to the Balearic Isles and along the southern shores of Europe, being taken, we are informed, all the year round in the sea off Rome; while most authors state it to be a deep-sea fish.

Mr. Clarke has described and figured *Argentina decagon* from New Zealand, where a unique example was procured, and which does not differ from my specimen, except that it is stated to have four rows of scales between the lateral line and base of the dorsal fin, whereas I only count three. At first sight it would seem strange that this species could stray from the North Atlantic to the South Pacific ocean, even if we accepted Mr. Clarke's suggestion that "it would be of excessive interest to have more proof than mere imagination that our antipodean species had gradually worked its way '*sub mari*' in those cold lower strata of water to

our coast." Several European species of fish have been found existing in more or less plenty in that portion of the world and in Tasmania—as *Chondropterygian* fishes destitute of air-bladders, and *Sciæna aquila*, *Zeus faber*, and *Trachurus trachurus* (species with the air-bladder of the *Physoclisti* type), all of which, we might perhaps imagine, could work their way "sub mari" in a colder stratum of the water. But *Clupea sprattus* and *Engraulis encrasi-cholus* (var.), physostomous surface-swimming European forms, have likewise been taken in Tasmania; and it does not seem credible that such forms would live at great depths in the tropics and travel in safety through the warmer regions of the globe, to pass from the North Atlantic to the South Pacific ocean. Whatever the explanation may be, the fact remains; and to the European forms of fish which have been recorded as existing in the anti-podes, the *Argentina sphyræna* must be added.

[Since the foregoing paper was read, Professor Giglioli has published the following remark in his 'Catalogo degli Anfibi e dei Pesci Italiani,' under the head of *Argentina sphyræna*:—"Non frequente, ma neppure rara; così sul mercato di Roma nel gennaio 1879 ne ho veduto ceste piene. Credo poter affermare che, se basata sulla mancanza di denti linguali, l'*A. lioglossa*, C. e V. va cancellata, giacchè nella serie raccolta a Messina si vede ogni possibile gradazione nello sviluppo di quei denti ed alcuni esemplari ne sono privi senza per altro differire dagli altri."]

#### EXPLANATION OF PLATE IV.

- Fig. 1. *Argentina sphyræna*, Linn., reduced.  
 2. Diagrammatic outline, transverse section of body.  
 3. Stomach and cæcal appendages.

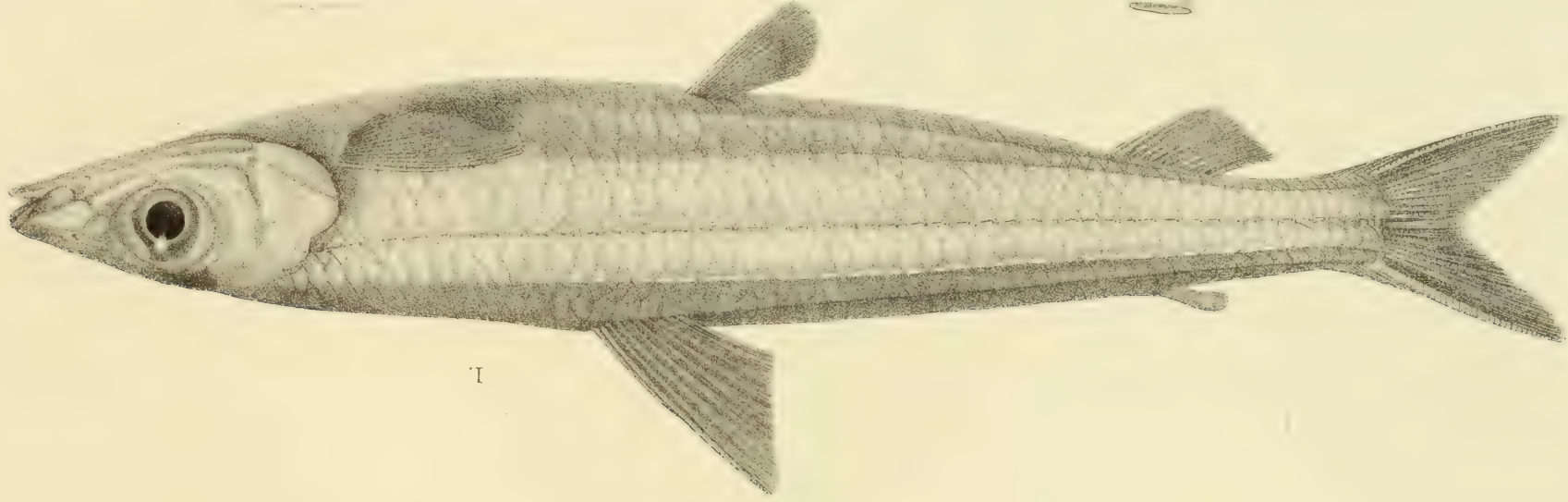
Description of a new Genus of Moth of the Family *Liparidæ* from Madagascar. By ARTHUR G. BUTLER, F.L.S., F.Z.S., &c.

[Read April 1, 1880.]

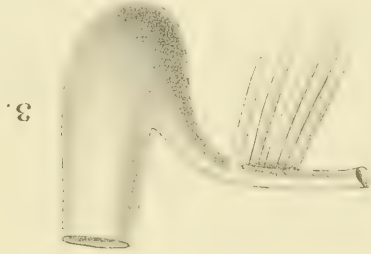
THE following new genus was received last year in a collection made by Mr. Shaw at Fianarantsoa, Madagascar; but I had at the time so strong an impression that I had somewhere seen a figure or a named example of the species, that I hesitated to describe it: it is probable that I had in my mind the New-World genus *Megalopyge* of the family *Lasiocampidæ*, which bears a vague resemblance to it in some respects. I now have no doubt

F. Day del.

LINN. Soc. JOURN. Zool. Vol. XV. Pl. IV.



1.



3.



12

C. Achille's lith.

ARGENTINA SPHYRÆNA Linn.

Mintern, Brös imp.